

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application:

1-5. (Canceled)

6. (Currently Amended): A driving control device for an actuator comprising:
a drive circuit configured to drive an electric motor of an actuator for opening and closing an air conditioning door; and
a drive control circuit configured to control a rotation of said electric motor by controlling the drive circuit,

wherein said drive circuit includes an H bridge circuit having a switching semiconductor element,

wherein said drive circuit is configured to rotate said electric motor in forward and reverse directions by turning on and/or off said switching semiconductor element,

wherein said drive control circuit is configured to start and/or stop said electric motor by applying a PWM signal to the switching semiconductor element constructing a lower arm of said H bridge circuit, and

wherein, when starting the electric motor, said drive control circuit is configured to apply the PWM signal to the switching semiconductor element constructing the lower arm of said H bridge circuit such that a duty ratio of the PWM signal increases based on a first predetermined rate.

7. (Previously Presented): The actuator driving control device according to Claim 6, wherein a regenerative braking is applied to said electric motor by applying said PWM signal to the switching semiconductor element constructing said lower arm.

8. (Previously Presented): The actuator driving control device according to Claim 6, wherein said drive control circuit is capable of selecting a first mode for applying the PWM signal, or a second mode for applying a driving pulse, to the switching semiconductor element constructing said lower arm.

9. (Currently Amended): ~~The actuator driving control device according to Claim 8,~~
A driving control device for an actuator comprising:

a drive circuit configured to drive an electric motor of an actuator for opening and closing an air conditioning door; and

a drive control circuit configured to control a rotation of said electric motor by controlling the drive circuit,

wherein said drive circuit includes an H bridge circuit having a switching semiconductor element,

wherein said drive circuit is configured to rotate said electric motor in forward and reverse directions by turning on and/or off said switching semiconductor element,

wherein said drive control circuit is configured to start and/or stop said electric motor by applying a PWM signal to the switching semiconductor element constructing a lower arm of said H bridge circuit,

wherein said drive control circuit is capable of selecting a first mode for applying the PWM signal, or a second mode for applying a driving pulse, to the switching semiconductor element constructing said lower arm,

wherein said drive control circuit is communicatively connected to a radio, and

wherein said drive control circuit is configured to apply the driving pulse when a radio is turned on and is configured to apply the PWM signal when said radio is turned off.

10. (Previously Presented): The actuator driving control device according to Claim 8, wherein said drive control circuit is configured to switch to the mode for applying the driving pulse when a targeted torque of the motor is not obtained even if the PWM signal is applied.

11. (Canceled):

12. (Currently Amended): The actuator driving control device according to Claim 6, Claim 11, wherein, when stopping the electric motor, said drive control circuit is configured to apply the PWM signal to the switching semiconductor element constructing the lower arm of said H bridge circuit such that duty ratio of the PWM signal decreases based on a second predetermined rate.

13. (Currently Amended): The actuator driving control device according to Claim 12, A driving control device for an actuator comprising:

a drive circuit configured to drive an electric motor of an actuator for opening and closing an air conditioning door; and

a drive control circuit configured to control a rotation of said electric motor by controlling the drive circuit,

wherein said drive circuit includes an H bridge circuit having a switching semiconductor element,

wherein said drive circuit is configured to rotate said electric motor in forward and reverse directions by turning on and/or off said switching semiconductor element,

wherein said drive control circuit is configured to start and/or stop said electric motor by applying a PWM signal to the switching semiconductor element constructing a lower arm of said H bridge circuit,

wherein, when starting the electric motor, said drive control circuit is configured to apply the PWM signal to the switching semiconductor element constructing the lower arm of said H bridge circuit such that a duty ratio of the PWM signal increases based on a first predetermined rate,

wherein, when stopping the electric motor, said drive control circuit is configured to apply the PWM signal to the switching semiconductor element constructing the lower arm of said H bridge circuit such that duty ratio of the PWM signal decreases based on a second predetermined rate, and

wherein the first and second predetermined rates are substantially equal.

14. (Currently Amended): A driving control device for an actuator comprising:
a drive circuit configured to drive an electric motor of an actuator; and
a drive control circuit configured to control a rotation of said electric motor by
controlling the drive circuit,

wherein said drive circuit includes an H bridge circuit having a switching
semiconductor element,

wherein said drive circuit is configured to rotate said electric motor in forward and
reverse directions by turning on and/or off said switching semiconductor element,

wherein said drive control circuit is configured to start and/or stop said electric motor
by applying a PWM signal to the switching semiconductor element constructing a lower arm
of said H bridge circuit,

wherein said drive control circuit is communicably connected to a radio, and

wherein said drive control circuit is configured to apply a driving pulse when a radio
said radio is turned on and is configured to apply the PWM signal when said radio is turned
off.

15. (Previously Presented): The actuator driving control device according to Claim
14, wherein a regenerative braking is applied to said electric motor by applying said PWM
signal to the switching semiconductor element constructing said lower arm.

16. (Previously Presented): The actuator driving control device according to Claim
14, wherein said drive control circuit is capable of selecting a first mode for applying the
PWM signal, or a second mode for applying the driving pulse, to the switching
semiconductor element constructing said lower arm.

17. (Previously Presented): The actuator driving control device according to Claim
14, wherein said drive control circuit is configured to switch to the mode for applying the
driving pulse when a targeted torque of the motor is not obtained even if the PWM signal is
applied.

18. (Previously Presented): The actuator driving control device according to Claim 14, wherein, when starting the electric motor, said drive control circuit is configured to apply the PWM signal to the switching semiconductor element constructing the lower arm of said H bridge circuit such that a duty ratio of the PWM signal increases based on a first predetermined rate.

19. (Previously Presented): The actuator driving control device according to Claim 18, wherein, when stopping the electric motor, said drive control circuit is configured to apply the PWM signal to the switching semiconductor element constructing the lower arm of said H bridge circuit such that duty ratio of the PWM signal decreases based on a second predetermined rate.

20. (Previously Presented): The actuator driving control device according to Claim 19, wherein the first and second predetermined rates are substantially equal.

21. (Previously Presented): The actuator driving control device according to Claim 14, wherein the drive circuit is configured to drive the electric motor of the actuator for opening and closing an air conditioning door.

22. (Currently Amended): ~~A driving~~ ~~The~~ control device for an actuator comprising: according to Claim 6,

~~a drive circuit configured to drive an electric motor of an actuator; and~~

~~a drive control circuit configured to control a rotation of said electric motor by controlling the drive circuit,~~

~~wherein said drive circuit includes an H bridge circuit having a switching semiconductor element,~~

~~wherein said drive circuit is configured to rotate said electric motor in forward and reverse directions by turning on and/or off said switching semiconductor element,~~

~~wherein said drive control circuit is configured to start and/or stop said electric motor by applying a PWM signal to the switching semiconductor element constructing a lower arm of said H bridge circuit, and~~

~~wherein a duty ratio of the PWM signal varies based on a predetermined rate from a first value to a second value.~~

23. (Currently Amended): The actuator driving control device according to Claim 26, Claim 22, wherein the drive circuit configured to drive the electric motor of the actuator for opening and closing an air conditioning door.

24. (Previously Presented): The actuator driving control device according to Claim 22, wherein a regenerative braking is applied to said electric motor by applying said PWM signal to the switching semiconductor element constructing said lower arm.

25. (Previously Presented): The actuator driving control device according to Claim 22, wherein said drive control circuit is capable of selecting a first mode for applying the PWM signal, or a second mode for applying a driving pulse, to the switching semiconductor element constructing said lower arm.

26. (Currently Amended): ~~The actuator driving control device according to Claim 25, A driving control device for an actuator comprising:~~

a drive circuit configured to drive an electric motor of an actuator; and

a drive control circuit configured to control a rotation of said electric motor by controlling the drive circuit,

wherein said drive circuit includes an H bridge circuit having a switching semiconductor element,

wherein said drive circuit is configured to rotate said electric motor in forward and reverse directions by turning on and/or off said switching semiconductor element,

wherein said drive control circuit is configured to start and/or stop said electric motor by applying a PWM signal to the switching semiconductor element constructing a lower arm of said H bridge circuit,

wherein a duty ratio of the PWM signal varies based on a predetermined rate from a first value to a second value,

wherein said drive control circuit is capable of selecting a first mode for applying the PWM signal, or a second mode for applying a driving pulse, to the switching semiconductor element constructing said lower arm,

wherein said drive control circuit is communicatively connected to a radio, and

wherein said drive control circuit is configured to apply the driving pulse when said radio is turned on and is configured to apply the PWM signal when said radio is turned off.

27. (Previously Presented): The actuator driving control device according to Claim 25, wherein said drive control circuit is configured to switch to the mode for applying the driving pulse when a targeted torque of the motor is not obtained even if the PWM signal is applied.

28. (Previously Presented): The actuator driving control device according to Claim 22, wherein, when starting the electric motor, said drive control circuit is configured to apply the PWM signal to the switching semiconductor element constructing the lower arm of said H bridge circuit such that the duty ratio of the PWM signal increases based on the predetermined rate.

29. (Previously Presented): The actuator driving control device according to Claim 28, wherein, when stopping the electric motor, said drive control circuit is configured to apply the PWM signal to the switching semiconductor element constructing the lower arm of said H bridge circuit such that duty ratio of the PWM signal decreases based on the predetermined rate.

30. (New): The actuator driving control device according to Claim 9, wherein, when starting the electric motor, said drive control circuit is configured to apply the PWM signal to the switching semiconductor element constructing the lower arm of said H bridge circuit such that a duty ratio of the PWM signal increases based on a first predetermined rate.

31. (New): The actuator driving control device according to Claim 30, wherein, when stopping the electric motor, said drive control circuit is configured to apply the PWM signal to the switching semiconductor element constructing the lower arm of said H bridge circuit such that duty ratio of the PWM signal decreases based on a second predetermined rate.

32. (New): The actuator driving control device according to Claim 13, wherein a regenerative braking is applied to said electric motor by applying said PWM signal to the switching semiconductor element constructing said lower arm.

33. (New): The actuator driving control device according to Claim 13, wherein said drive control circuit is capable of selecting a first mode for applying the PWM signal, or a second mode for applying a driving pulse, to the switching semiconductor element constructing said lower arm.

34. (New): The actuator driving control device according to Claim 33, wherein said drive control circuit is configured to switch to the mode for applying the driving pulse when a targeted torque of the motor is not obtained even if the PWM signal is applied.

35. (New): The actuator driving control device according to Claim 26, wherein a regenerative braking is applied to said electric motor by applying said PWM signal to the switching semiconductor element constructing said lower arm.

36. (New): The actuator driving control device according to Claim 26, wherein said drive control circuit is configured to switch to the mode for applying the driving pulse when a targeted torque of the motor is not obtained even if the PWM signal is applied.

37. (New): The actuator driving control device according to Claim 26, wherein, when starting the electric motor, said drive control circuit is configured to apply the PWM signal to the switching semiconductor element constructing the lower arm of said H bridge circuit such that the duty ratio of the PWM signal increases based on the predetermined rate.

38. (New): The actuator driving control device according to Claim 37, wherein, when stopping the electric motor, said drive control circuit is configured to apply the PWM signal to the switching semiconductor element constructing the lower arm of said H bridge circuit such that duty ratio of the PWM signal decreases based on the predetermined rate.